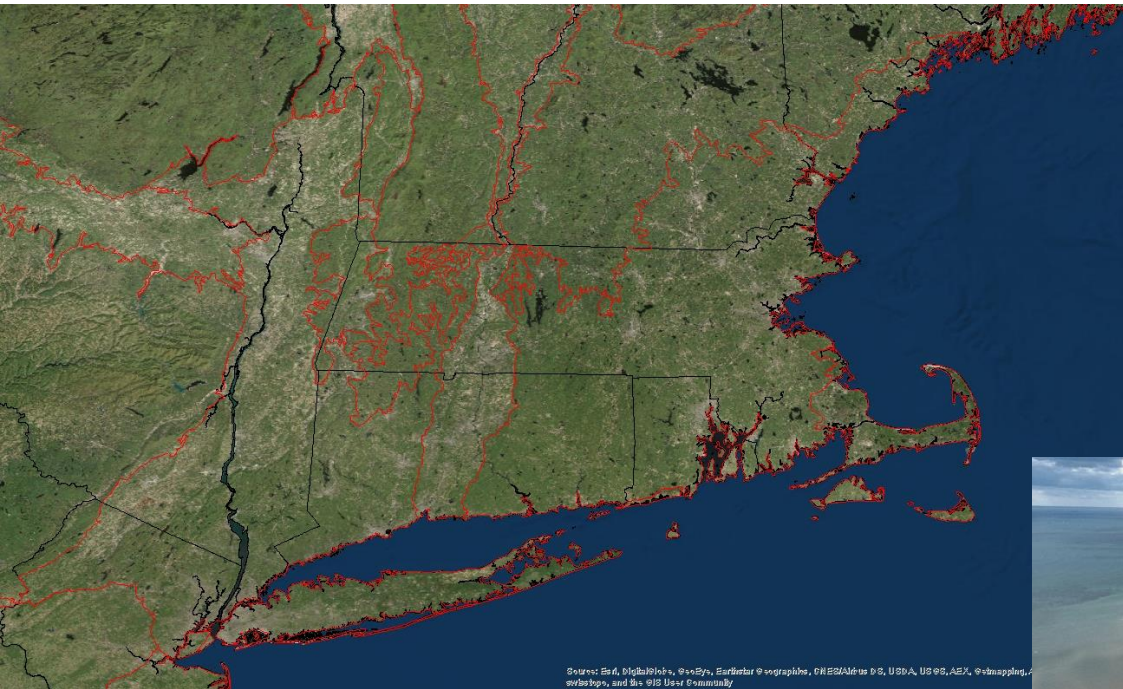




United States Department of Agriculture



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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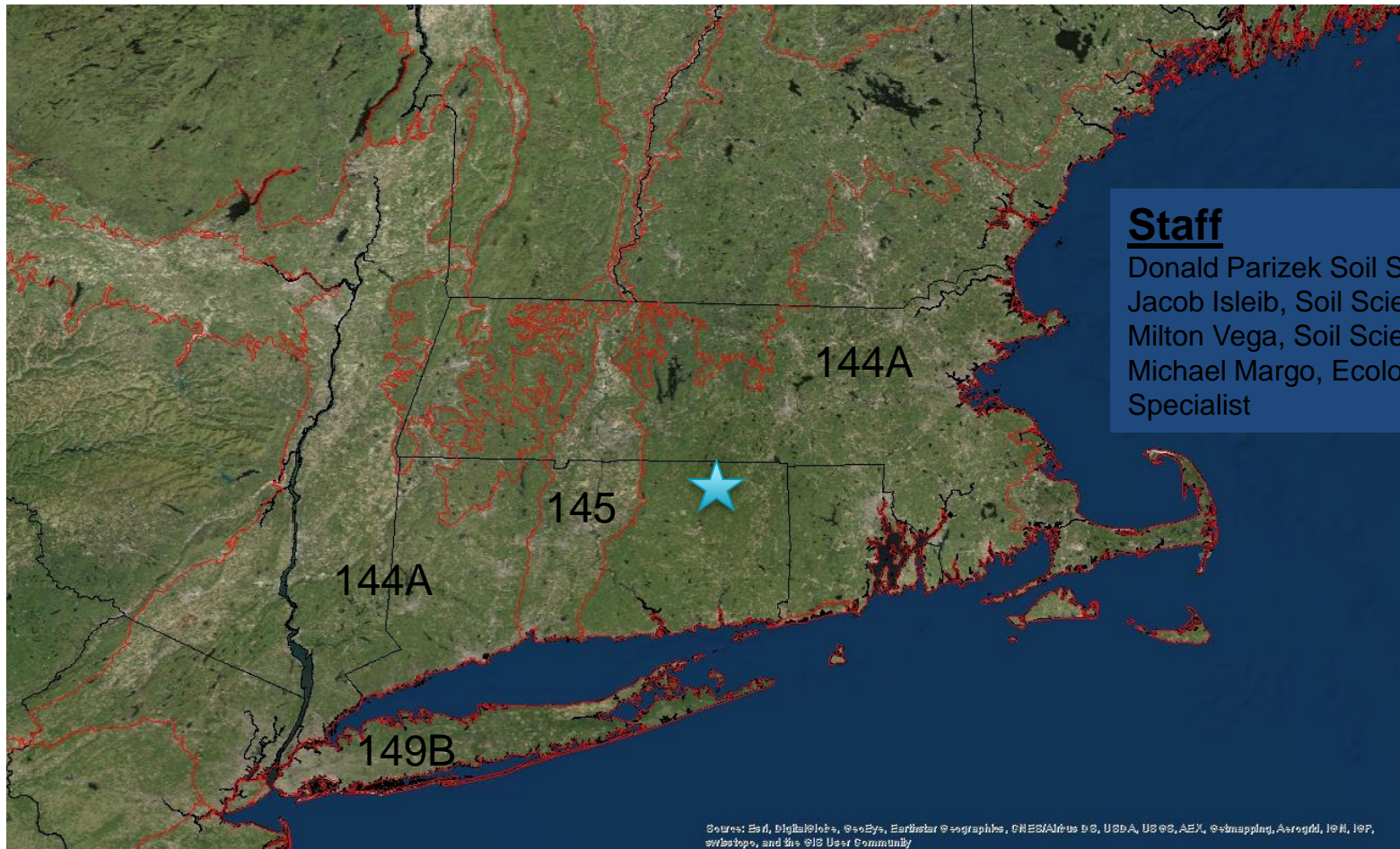


12-TOL Soil Survey Updates in the Coastal Zone

April 18, 2017
Donald Parizek, 12-TOL MLRA
Soil Survey Project Leader

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Staff
 Donald Parizek Soil Scientist
 Jacob Isleib, Soil Scientist
 Milton Vega, Soil Scientist
 Michael Margo, Ecological Site Specialist

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community

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A Case For Coastal Zone Soil Survey

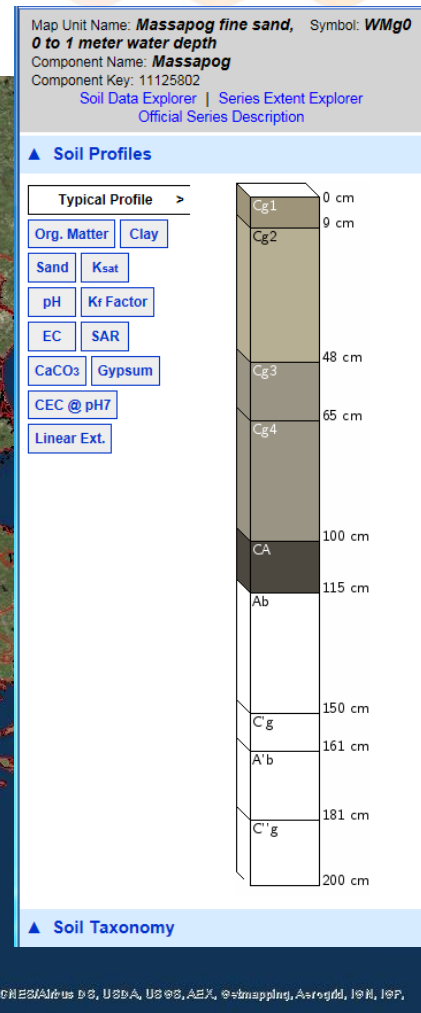
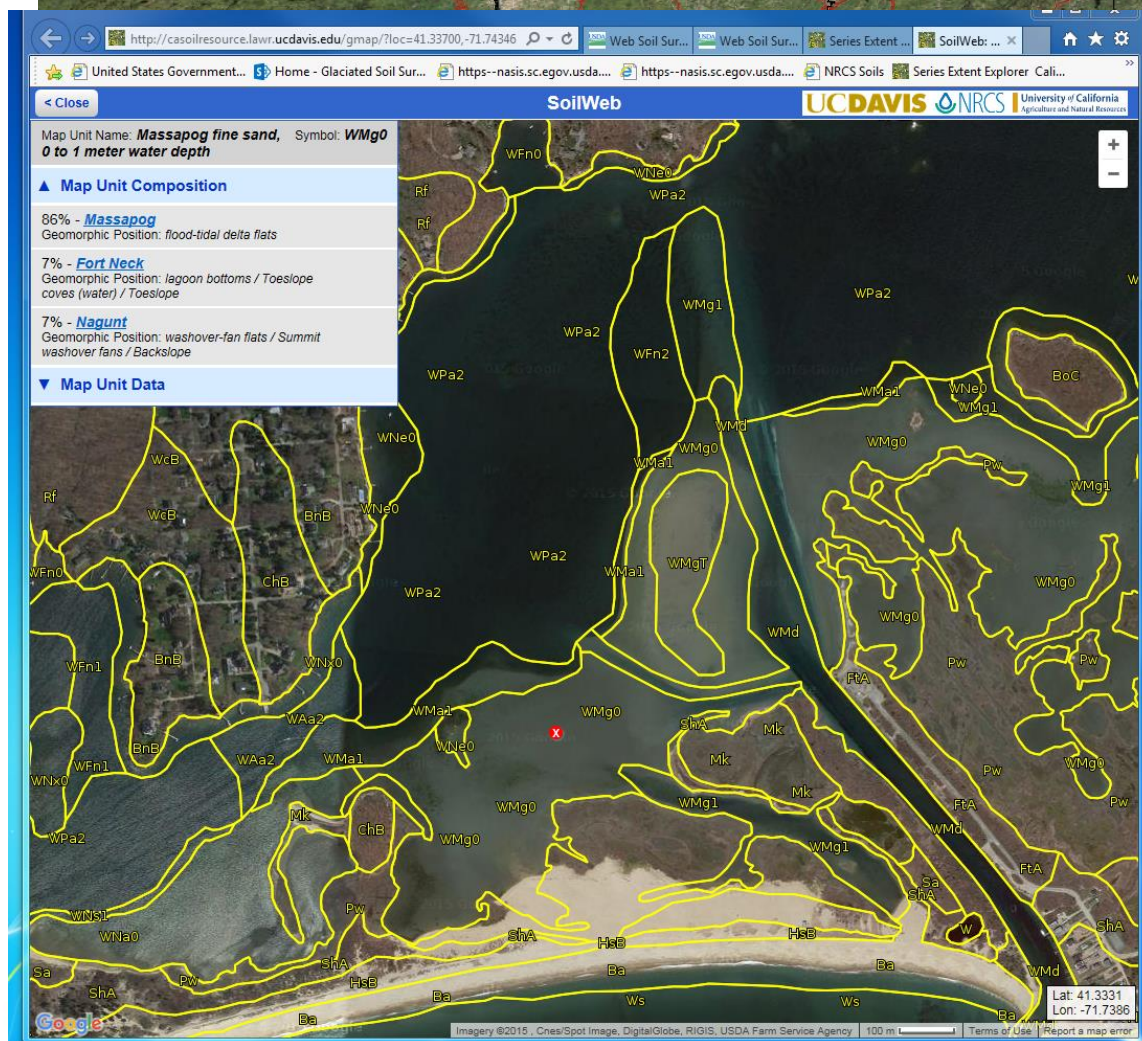
- **Sea Level Rise – 0.4 to 0.1 inches per year in the last 100 years**
(NOAA 2016)
- **Value of Aquaculture – Doubling current U.S. aquaculture could result in 50,000 jobs and over a \$1 billion in farm-gate value**
(Source: G. Knapp, 'Offshore Aquaculture in the United States, NOAA Tech Memo NMFS F/SPO-103)
- **16.4 Million U.S. residents live within the coastal flood zone**
(NOAA 2012)
- **Ecological Site Descriptions – A thorough understanding of the subaqueous and subaerial soils systems interactions for successful coastal zone restoration and conservation**
- **The definition of soil includes subaqueous soils**
(Soil Survey Staff, 1999)
- **Soil science is the fundamental building block for all other resource management**
- **Carbon Accounting and Climate Change Research, Blue Carbon**



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Published Coastal Zone Soil Survey In Rhode Island



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Subaqueous Soil Survey

Vibracoring in Little Narragansett Bay 2006

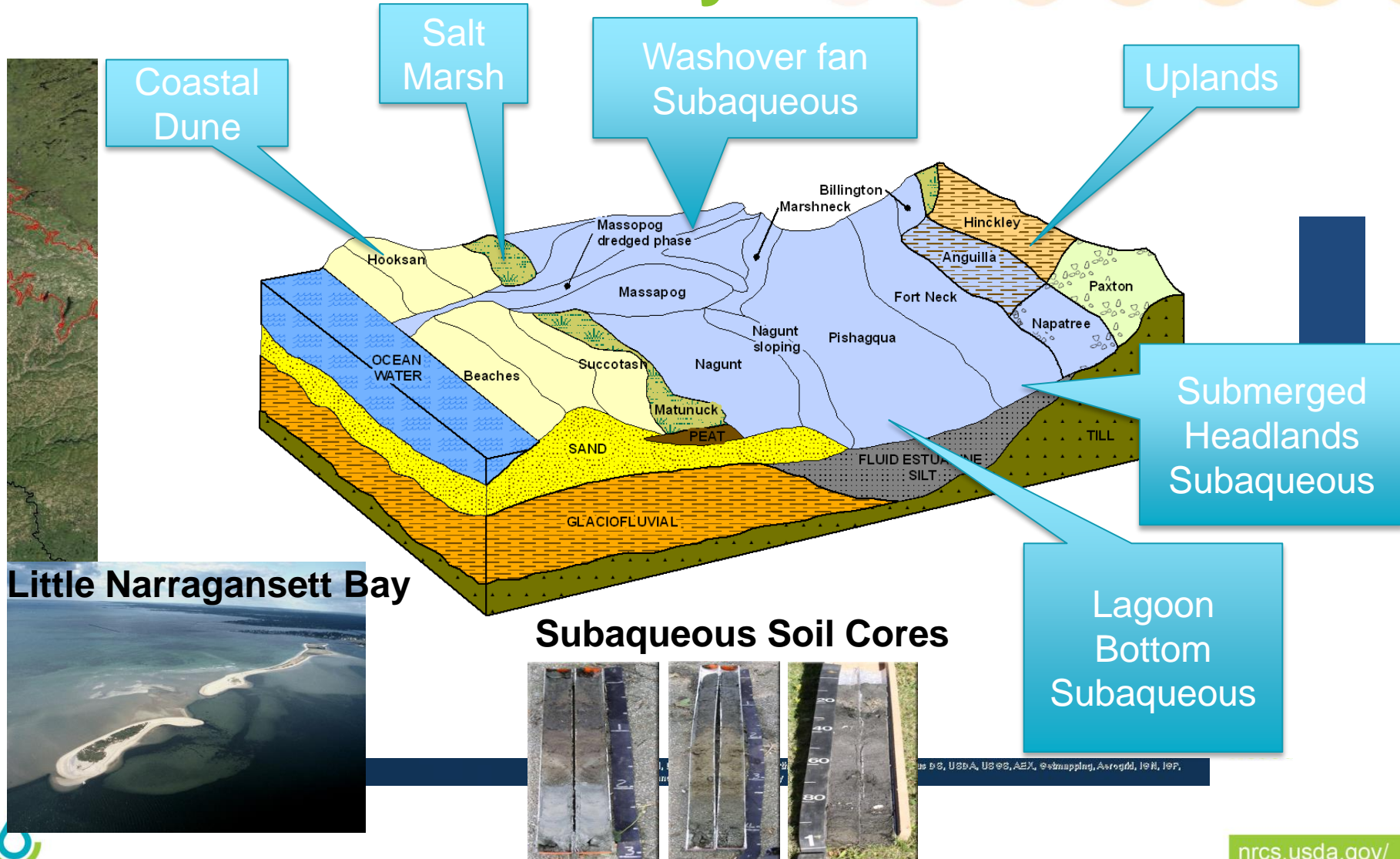


NRCS soil survey staff retrieving a subaqueous soil core, Thimble Islands, Branford, CT, 2014



Subaqueous soil investigations using a bucket auger, Little Narragansett Bay, 2006

Coastal Zone Soil Systems



Definition of Soil



A natural body comprised of solids (minerals and organic matter), liquid, and gases that occurs on the land surface, occupies space, and is characterized by one or both of the following: horizons or layers, that are distinguishable from the initial material as a result of additions, losses, transfers, and transformations of energy and matter or the ability to support rooted plants in a natural environment (Soil Survey Staff, 1999).

Eel grass, a rooted vascular plant in Long Island Sound



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Subaqueous Soils and The Stratigraphic Record



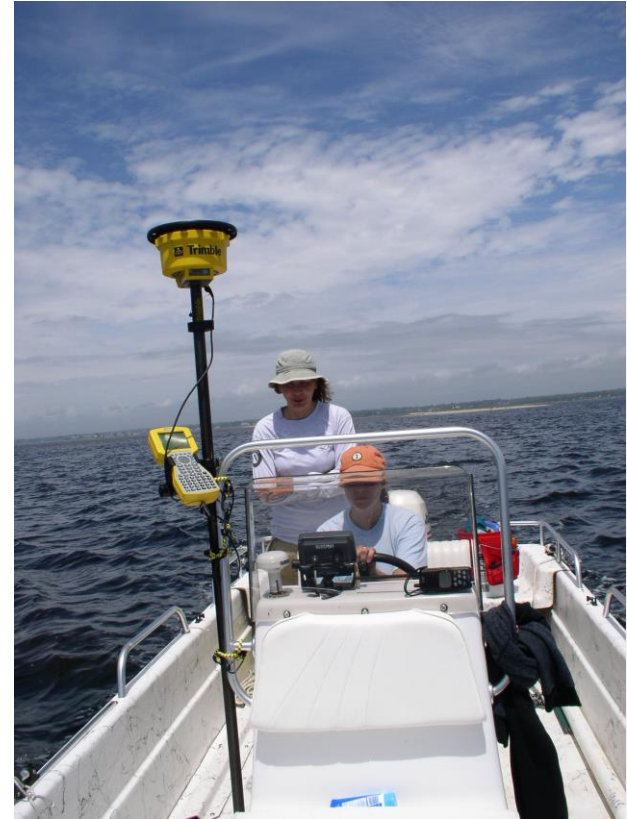
- Record of Past Environments
- Current Conditions
- Prediction Model for Sea Level Rise

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Collecting Bathymetry



- Tidal Corrections
- GPS and RTK Survey Equipment
- Acoustic Fathometer
- Tidal Gages and the Lunar Cycle

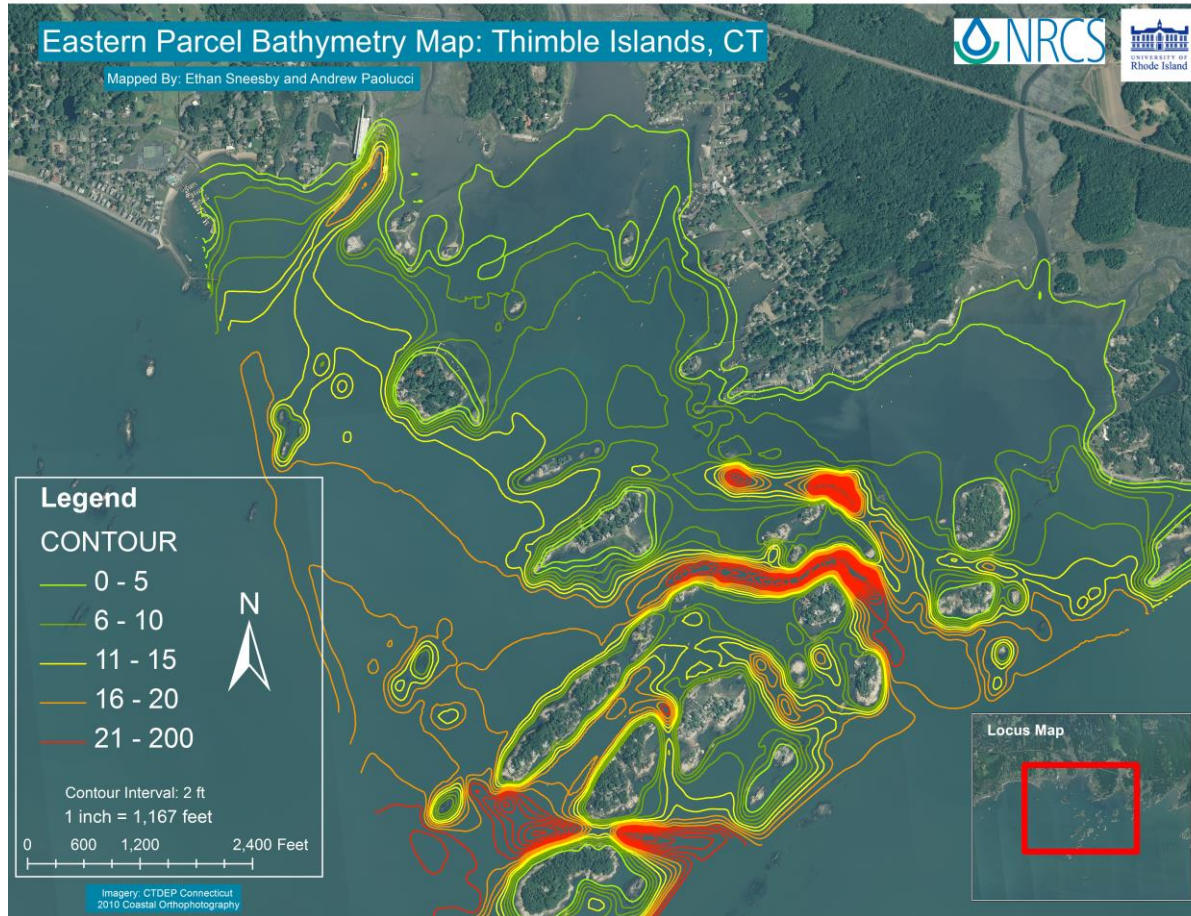


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Base Map

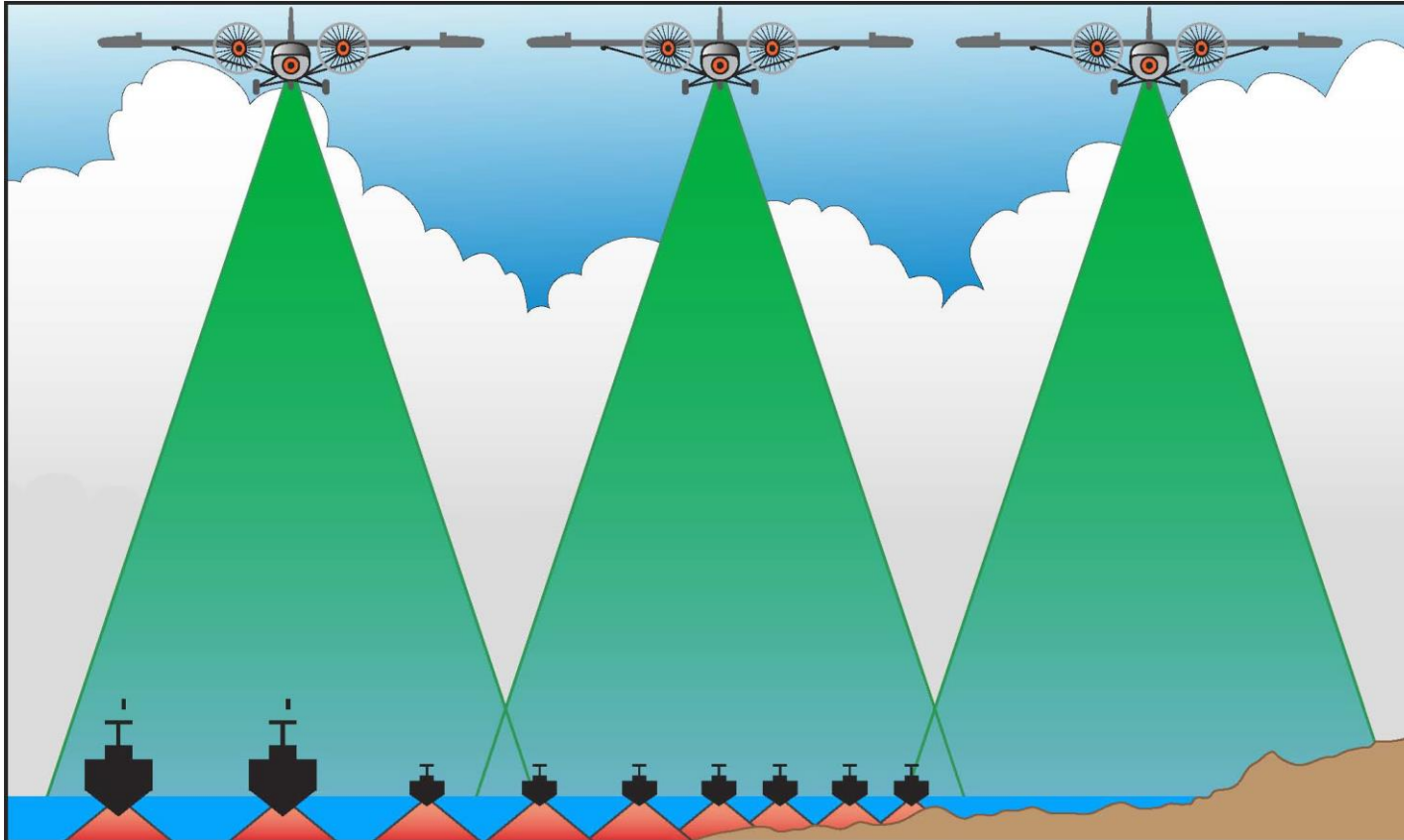


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Green Laser LIDAR Topobathy



LIDAR (Light Detection And Ranging)

- Time saver, rapid surveys of large areas
- Very detailed
- Works best in clear water (low turbidity)
- Wide range of applications
- Limited coverage at this time
- Water quality and depth limitations
- Expensive



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Collecting the Soil Data



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Describing Cores in the Lab



Special Procedures

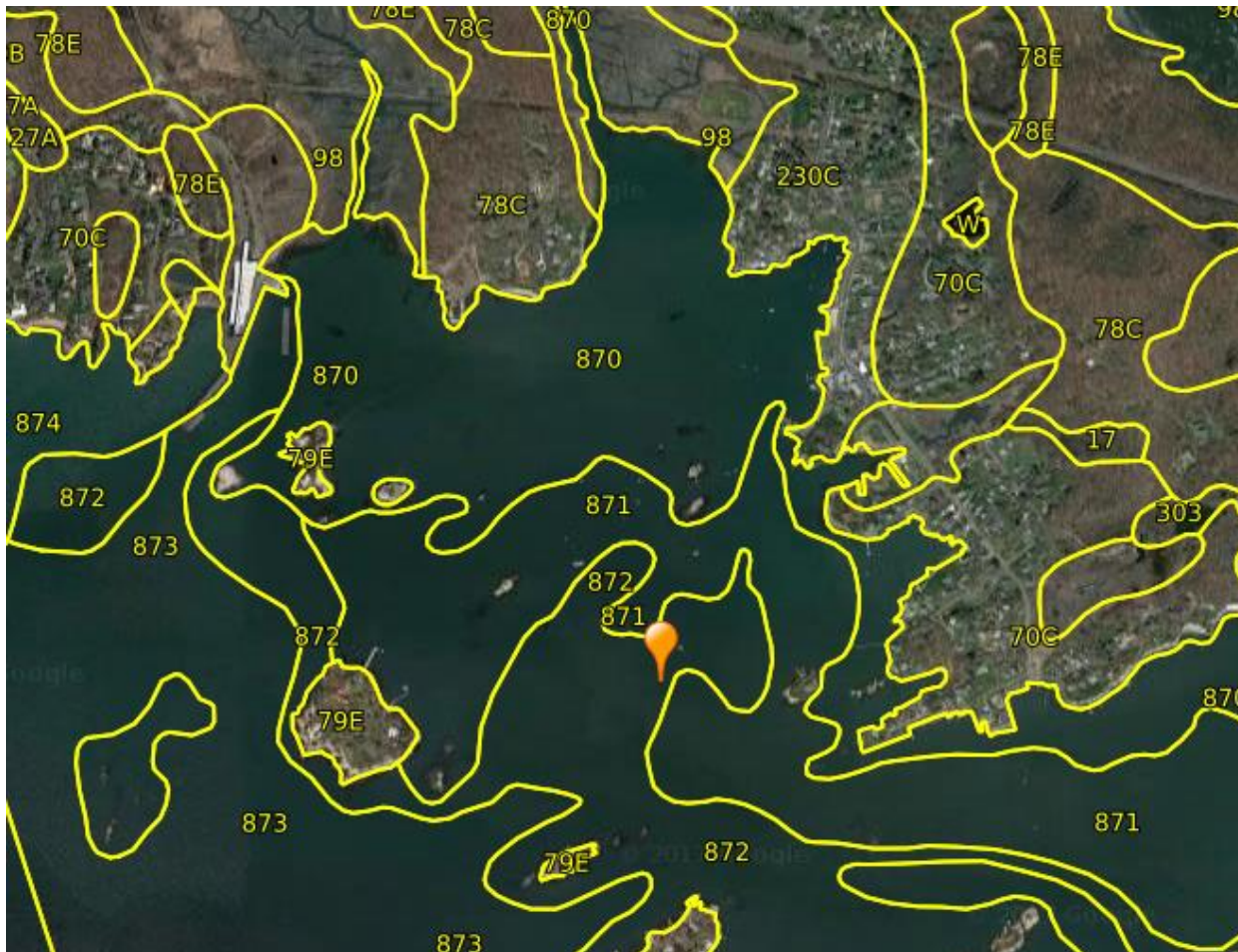
- Cold Storage
- Incubation pH
- Salinity
- Odor
- Acid Volatile Sulfide Test (AVS)
- Hydrogen Peroxide color change
- Fluidity
- Limited sample size

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Coastal Zone Soil Survey



Coast Zone Soil Survey

- **Seamless coverage into the shallow water areas**
- **Soil forming processes continue below the water surface**
- **Soil interpretations**
- **Keeping soil survey relevant**

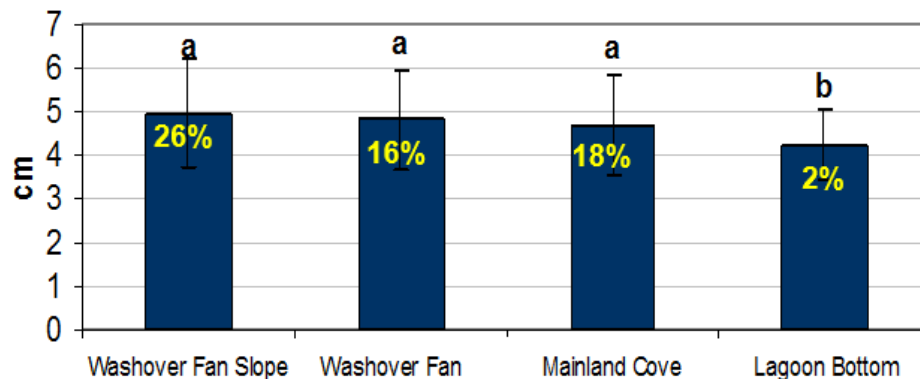
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Shellfish Growth Research – University of Rhode Island

Ninigret Pond Mean Oyster Length (cm)
October 2008 16 wk growing period



% oysters within 16 mm of legal harvesting size after 1 growing season

Soil Interpretations

- Grain size of surface horizon predictor of oyster growth
- Shellfish grew faster on coarser textured soils
- Soil surveys can provide managers with a tool for locating future aquaculture farms

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Ecological Site Descriptions (ESD)

An **ecological site** is a conceptual landscape division defined by recurring soil, landform, geological, and climate characteristics. A site produces distinctive kinds, amounts, and proportions of vegetation and **responds similarly to management actions and natural disturbances.**



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Questions?



Willelt Pond,
East Providence,
Rhode Island

Soil Conservation
Service photo,
1970

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